

Remarks

Reconsideration of the application and allowance of all pending claims are respectfully requested in light of the remarks below. Claims 1-54 remain pending.

In the Office Action dated March 27, 2003, claims 1-54 are rejected under 35 U.S.C. 102(b) as being anticipated by Galbraith et al. (U.S. Patent No. 5,265,240). Applicants respectfully, but most strenuously, traverse this rejection for the reasons below.

In one aspect, applicants' invention is directed to measuring the utilization of individual components of channels. That is, a channel has a plurality of individual components and one or more of those individual components are monitored and measured to determine the utilization of a particular component. This is advantageous because the modern channels, such as Ficon channels, are able to multiplex many I/O operations at the same time and can pipeline the execution of channel programs, and thus, measuring the utilization of individual components facilitates planning for those channels. Further details regarding a channel that has a plurality of components are described below.

Referring to FIG. 4 of applicants' specification, as one example, channel 116 includes a plurality of components, such as, for instance, a channel processor 408, an internal PCI bus 406 from the processor to the adapter, and an adapter card 410 (e.g., a fibre channel adapter). The channel processor is responsible for interpreting the channel command words and moving data to and from host memory to channel memory 400. The PCI bus moves instructions and data from channel processor storage 400 to adapter 410. The fibre channel adapter moves instructions and data from the PCI bus to the external fabric attached control units 412. Depending on the type of channel programs executed by the system, each of the three components of the channel may reach the limits of its capacity separately.

For example, small channel programs that include a few channel command words, but transfer a huge amount of data, will have very little use of channel processor 408, but will cause a very high utilization on internal PCI bus 406. However, a very long channel program that includes many channel command words, but only transfers very small amounts of data,

require very high utilization of the channel processor, but little use of the internal PCI bus and fibre channel adapter. Thus, no single number can represent the channel utilization, since the components of the channel perform different tasks and can reach saturation at different points, depending on the nature of the I/O requests for the applications using the channel. Further, many different applications can execute simultaneously on the channel, each with different characteristics and stressing different components of the channel at the same time. Therefore, in order for a customer to perform capacity planning and to correctly identify the resource of the channel that may be the bottleneck, each component is reported on separately. This allows the customer to identify the applications' I/O characteristics that can be added without saturating the channel, or that can be removed to avoid saturation.

In one example (e.g., independent claim 1), applicants claim a method of determining utilization of channel components of a computing environment. The method includes, for instance, obtaining measurement data for a selected component of a channel, the channel comprising a plurality of components; and using the measurement data to determine utilization of that selected component. Thus, in applicants' claimed invention, the channel includes a plurality of components, and measurement data is provided for a selected one of those components. That measurement data is used to determine utilization of the selected component. This is very different from the teachings of Galbraith.

In Galbraith, there is no discussion of components of a channel. Instead, a channel is considered as one entity. This is explicitly stated throughout Galbraith. For instance, in the abstract, it states, "Provides a method for measuring the busy utilization time for I/O channel used by any of plural operating systems (OSs) in a CEC." The utilization time is measured for the entire I/O channel. There is no discussion of individual components of a channel or of measuring the individual components of a channel, as claimed by applicants.

In support of the rejection, the Office Action states:

Galbraith's channel does include a plurality of components. Applicants' FIG. 1 shows the plurality of channel components (structure 116); Galbraith's FIG. 1, which is substantially similar to applicants' FIG. 1, also has the channel components.

Applicants respectfully disagree that structure 116 is a depiction of a plurality of channel components. Instead, each structure 116 is a channel in and of itself. Applicants are not claiming in claim 1 a plurality of channels, but instead, a plurality of channel components of a channel. That is, applicants' claim is directed to the individual components of one channel. On example of the individual components of a channel are depicted in applicants' FIG. 4. There is no such corresponding illustration in Galbraith. Galbraith is not concerned with the components that make up a channel, but instead, is concerned with the channel as a whole. There is no teaching or suggestion in Galbraith of obtaining measurement data for a selected component of a channel that has a plurality of components, as claimed by applicants.

Moreover, applicants are not arguing whether Galbraith's channel has a plurality of components. Even if Galbraith's channel does have a plurality of components, there is no recognition in Galbraith of those individual components and there is no teaching or suggestion of obtaining measurement data for a selected component of a plurality of components of a channel. That is, regardless of whether a channel in Galbraith has various components, there is no teaching or suggestion in Galbraith of obtaining measurement data for a selected component of the various components. The channel is treated as one entity.

It is further stated in the Office Action:

Galbraith's column 3, lines 54-56 states that each channel performs its own measurement; and the channels here means the channels within the I/O channel subsystem (as shown in Galbraith's figure 1, and further supported in column 3, lines 57-60), which is the components of the I/O channel subsystem, and the components of Applicants' claimed channel.

Applicants respectfully disagree with portions of the above statement.

While applicants agree that Galbraith's channels and applicants' channels are channels within an I/O channel subsystem, applicants are not claiming components of an I/O subsystem, but instead are claiming components of a channel within that I/O subsystem. Again, applicants are focused on the individual components of a channel. Applicants obtain measurement data for one or more of those individual channel components. Again, this is not taught nor suggested by Galbraith. Galbraith merely mentions a channel and does not

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discuss the components that make up a channel or of obtaining measurement data for the individual components of a channel. Therefore, Galbraith does not describe, teach or suggest applicants' claimed invention.

Based on the foregoing, applicants respectfully submit that claim 1, as well as claims 21, 39 and 42 are patentable over Galbraith. The claims dependent therefrom are also patentable for similar reasons, as well as for their own additional features. Similarly, claims 15, 33, 40 and 50, and those dependent thereon, are patentable for the reasons described above.

In addition to the above, claims 20, 38, 41 and 54 are patentable over Galbraith. For instance, in independent claim 20, a method of determining utilization of channels of a computing environment is recited. The computing environment includes a plurality of logical partitions and the method includes, for instance, obtaining on behalf of a logical partition involved in determining utilization of a channel measurement data for the channel. The measurement data is representative of use of the channel by the logical partition and representative of use by one or more other logical partitions of the plurality of logical partitions. That measurement data is then used to determine utilization of the channel. Thus, in applicants' claimed invention, the measurement data obtained for a particular logical partition is measurement data representative of a plurality of logical partitions (e.g., the logical partition involved in determining the utilization, as well as one or more other logical partitions). This is very different from the teachings of Galbraith.

Although Galbraith teaches a plurality of logical partitions, Galbraith does not teach or suggest that measurement data obtained for a particular logical partition is representative of multiple logical partitions. Instead, in Galbraith, the measurement data for each logical partition is exclusive for that logical partition. This is explicitly stated in Galbraith. For example, in Col. 2, lines 12-14, it is stated "The two OSs must be provided measurements which do not indicate the other OSs use of the shared I/O resources." Therefore, the measurements provided are for a single operating system (i.e., a single logical partition), and not for multiple logical partitions, as claimed by applicants. Thus, applicants respectfully submit that Galbraith does not anticipate applicants' claimed invention.

In support of the rejection, it is stated in the Office Action:

Galbraith discloses a plurality of logical partitions (column 4, lines 15-16) and Galbraith also discloses that it is known to measure the utilization for each logical partition (column 2, lines 6-14).

Applicants respectfully submit that they are not simply claiming measuring the utilization for each logical partition, but instead, are explicitly claiming that the measurement data obtained for a particular logical partition is representative of use of the channel by multiple logical partitions. That is, the measurement data is representative of use of the channel by the logical partition involved in determining utilization of the channel, as well as use by one or more other logical partitions. There is no teaching or suggestion in Galbraith that the measurement data being obtained for a particular logical partition represents a plurality of logical partitions. Instead, in Galbraith, each logical partition only obtains the information for that particular logical partition. Thus, applicants respectfully submit that Galbraith does not teach or suggest applicants' claimed invention.

Based on the foregoing, applicants respectfully request an indication of allowability of all pending claims.

Applicants respectfully request the Examiner to telephone applicants' representative, should the Examiner still have concerns regarding this application.

Respectfully submitted,

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